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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/965,637   | 09/26/2001  | Pasi Tikka           | 944-003.113         | 2477             |
| 4955   | 7590        | 11/25/2005           | EXAMINER            |                  |
| WARE FRESSOLA VAN DER SLUYS &<br>ADOLPHSON, LLP<br>BRADFORD GREEN BUILDING 5<br>755 MAIN STREET, P O BOX 224<br>MONROE, CT 06468 |             |                      | NGUYEN, TUAN HOANG  |                  |
|  |             | ART UNIT             |                     | PAPER NUMBER     |
|  |             | 2643                 |                     |                  |
| DATE MAILED: 11/25/2005  |             |                      |                     |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                            |                  |  |
|------------------------------|----------------------------|------------------|--|
| <b>Office Action Summary</b> | Application No.            | Applicant(s)     |  |
|                              | 09/965,637                 | TIKKA ET AL.     |  |
|                              | Examiner<br>Tuan H. Nguyen | Art Unit<br>2643 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 26 September 2001.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-32 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-32 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4 and 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing").

Regarding claim 1, applicant admitted prior art in the specification discloses a dual-channel passband filtering device comprising: a first port (see specification page 2 lines 5-15, Fig. 1 item 924); a second port (see specification page 2 lines 5-15, Fig. 1 item 928); and a third port (see specification page 2 lines 5-15, Fig. 1 item 926), wherein at least one first passband filter (Fig. 1 Item 932) is connected between the first port and the second port (see specification page 2 lines 5-15, Fig. 1), and at least one second passband filter is connected between the second port and the third port via a phase shifter (see specification page 2 lines 5-15, Fig. 1 item 934), and wherein each of the first and second passband filters comprises: a first filter end having a first terminal (Fig. 1 Item 924) and a second terminal (Fig. 1 Item 928); a second filter end having a third terminal (Fig. 1 Item 926) and a fourth terminal (Fig. 1 the terminal of the second passband filter who connected to the Phase Shift Item 934); at least two series elements including a first and a second series element (see specification page 2 lines 5-15, Fig. 1 items 901, 903, 905). The prior art differs from the claimed invention in not specifically teaching for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic

resonator. However, Dailing teaches for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal (Col. 3 lines 32-49 Fig. 1 circuit 15); the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal (Col. 3 lines 32-49 Fig. 1 circuit 15); the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal (Col. 3 lines 32-49 Fig. 1 circuit 15); and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator (Col. 3 lines 32-49 Fig. 1 circuit 15). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the prior art for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator as per teaching of Dailing, because it provides an improved crystal filter circuit which allows for shaping of the passband of any chosen filter characteristic to a shape approaching the desired Gaussian curve in the passband

while maintaining the original frequency attenuation characteristics outside the passband.

Regarding claim 2, Dailing further discloses the first passband filter has a first passband frequency and the second passband filter has a second passband frequency different from the first passband frequency (Col. 1 line 62 through Col. 2 line 16).

Regarding claim 3, Dailing further discloses the first passband filter has a first passband frequency and the second passband filter has a second passband frequency and wherein the first and second passband frequencies are closely spaced in a frequency domain (Col. 1 line 62 through Col. 2 line 16).

Regarding claim 4, applicant admitted prior art in the specification discloses the acoustic resonators are bulk acoustic wave devices (page 1 lines 14-17).

Regarding claim 7, applicant admitted prior art in the specification discloses the acoustic resonators are thin-film bulk acoustic resonators (page 1 lines 12-23).

Regarding claim 8, applicant admitted prior art in the specification discloses the acoustic resonators are surface acoustic wave devices (page 2 lines 1-3).

Regarding claim 9, Dailing further discloses a balun (Item 10) connected to the second port for receiving a single-ended antenna (Fig. 1 circuit 15).

Regarding claim 10, Dailing further discloses a balun (Item 10) connected to the first port for providing a single-ended port for use in conjunction with a single-ended transceiver (Fig. 1 circuit 15).

Regarding claim 11, Dailing further discloses a balun (Item 10) connected to the third port for providing a single-ended port for use in conjunction with a single-ended transceiver (Fig. 1 circuit 15).

4. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing") as applied to claim 1 above and further in view of Ella (US PAT. 6,081,171).

Regarding claim 5, the applicant admitted prior art and Dailing, in combination, fails to discloses at least one of the acoustic resonators is a bridge-type bulk acoustic wave device. However, Ella teaches at least one of the acoustic resonators is a bridge-type bulk acoustic wave device (col. 17 lines 16-23 Fig. 1A & 1B). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Ella into view of the applicant admitted prior art and Dailing, in order to improve frequency response characteristics relative to the Multi-pole

Bulk Acoustic Wave Resonator Stacked Crystal Filter filtering circuit or device and includes a reduced number of passive components relative to the number of such components included in at least some conventional multi-pole filters.

Regarding claim 6, Ella further discloses at least one of the acoustic resonators is a mirror-type bulk acoustic wave device (col. 18 lines 8-20 Fig. 3A & 3B).

5. Claims 12-14, 20-28, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing") and further in view of Bradley et al. (EP 1,058,383 hereinafter, "Bradley").

Regarding claim 12, applicant admitted prior art in the specification discloses each of the first and second passband filters comprising: a first filter end having a first terminal (Fig. 1 Item 924) and a second terminal (Fig. 1 Item 928); a second filter end having a third terminal (Fig. 1 Item 926) and a fourth terminal (Fig. 1 the terminal of the second passband filter who connected to the Phase Shift Item 934); at least two series elements including a first and a second series element (see specification page 2 lines 5-15, Fig. 1 items 901, 903, 905). The prior art differs from the claimed invention in not specifically teaching for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal; the second series element

having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator. However, Dailing teaches for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal (Col. 3 lines 32-49 Fig. 1 circuit 15); the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal (Col. 3 lines 32-49 Fig. 1 circuit 15); the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal (Col. 3 lines 32-49 Fig. 1 circuit 15); and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator (Col. 3 lines 32-49 Fig. 1 circuit 15). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the prior art for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and

the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator as per teaching of Dailing, because it provides an improved crystal filter circuit which allows for shaping of the passband of any chosen filter characteristic to a shape approaching the desired Gaussian curve in the passband while maintaining the original frequency attenuation characteristics outside the passband. The applicant admitted prior art and Dailing, in combination, fails to discloses a front-end arrangement for use in a telecommunication device, comprising: an antenna port connected to an antenna system; a first port capable of conveying signals between a first transceiver connected to the first port and the antenna system via the antenna port; and a second port capable of conveying signals between a second transceiver connected to the second port and the antenna system via the antenna port, wherein at least one first passband filter is connected between the first port and the antenna port for filtering the signals conveyed between the first transceiver and the antenna system, and at least one second passband filter is connected between the second port and the antenna port via a phase shifter for filtering the signals conveyed between the second transceiver and the antenna system. However, Bradley teaches a front-end arrangement for use in a telecommunication device, comprising: an antenna port connected to an antenna system (page 2 [0004]); a first port capable of conveying signals between a first transceiver connected to the first port and the antenna system via the antenna port (page 2 [0005] Fig. 1); and a second port capable of conveying signals between a second transceiver connected to the second port and the antenna

system via the antenna port, wherein at least one first passband filter is connected between the first port and the antenna port for filtering the signals conveyed between the first transceiver and the antenna system, and at least one second passband filter is connected between the second port and the antenna port via a phase shifter for filtering the signals conveyed between the second transceiver and the antenna system (page 2 [0005] Fig. 1). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Bradley into view of the applicant admitted prior art and Dailing, in order to provide communications applications, a common signal path is coupled both to the input of a receiver and the output of the transmitter.

Regarding claim 13, Dailing further discloses the antenna port has a first port end and a second port end, and wherein the antenna system has a first antenna connected to the first port end, and a second antenna connected to the second port end (Fig. 1 Item 10 circuit 15).

Regarding claim 14, Dailing further discloses the antenna system comprises an antenna connected to the antenna port via a balun (Fig. 1 Item 10 circuit 15).

Regarding claim 20, Dailing further discloses the first passband filter has a first passband frequency and the second passband filter has a second passband frequency different from the first passband frequency (col. 1 line 62 through col. 2 line 16).

Regarding claim 21, Dailing further discloses the first passband filter has a first passband frequency and the second passband filter has a second passband frequency, and wherein the first and second passband frequencies are closely spaced in a frequency domain (col. 1 line 62 through col. 2 line 16).

Regarding claim 22, applicant admitted prior art in the specification discloses the telecommunication device is a mobile phone (page 1 lines 28-29).

Regarding claim 23, applicant admitted prior art in the specification discloses the telecommunication device is operated in a code-division multiple access mode (page 1 line 28 through page 2 line 3).

Regarding claim 24, applicant admitted prior art in the specification discloses the telecommunication device is operated in a wideband code-division multiple access mode (page 1 line 28 through page 2 line 3).

Regarding claim 25, Dailing further discloses the first transceiver is a receiver and the first passband filter has a first passband frequency substantially in the range of 1805 MHz-1880 MHz, and wherein the second transceiver is a receiver and the second passband filter has a second passband frequency substantially in the range of 1930

MHz-1990 MHz (col. 1 line 62 through col. 2 line 16).

Regarding claim 26, Dailing further discloses the first transceiver is a transmitter and the first passband filter has a first passband frequency substantially in the range of 1710 MHz-1785 MHz, and wherein the second transceiver is a receiver and the second passband filter has a second passband frequency substantially in the range of 1805 MHz-1880 MHz (col. 1 line 62 through col. 2 line 16).

Regarding claim 27, Dailing further discloses the first transceiver is a transmitter and the first passband filter has a first passband frequency substantially in the range of 1850 MHz-1910 MHz, and wherein the second transceiver is a receiver and the second passband filter has a second passband frequency substantially in the range of 1930 MHz-1990 MHz (col. 1 line 62 through col. 2 line 16).

Regarding claim 28, applicant admitted prior art in the specification discloses the acoustic resonators are bulk acoustic wave devices (page 1 lines 14-17).

Regarding claim 31, applicant admitted prior art in the specification discloses the acoustic resonators are thin-film bulk acoustic resonators (page 1 lines 12-23).

Regarding claim 32, applicant admitted prior art in the specification discloses the acoustic resonators are surface acoustic wave devices (page 2 lines 1-3).

6. Claims 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing") further in view of Bradley et al. (EP 1,058,383 hereinafter, "Bradley") as applied to claim 12 above and further in view of Franca-Neto (U.S PAT. 6,721,544).

Regarding claim 15, the applicant admitted prior art, Dailing, and Bradley in combination, fails to discloses the first transceiver is a transmitter and the second transceiver is a receiver. However, Franca-Neto teaches the first transceiver is a transmitter and the second transceiver is a receiver (col. 2 line 40 through col. 3 line 16 Fig. 1). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Franca-Neto into view of the applicant admitted prior art, Dailing, and Bradley in order to practice reduces the overall cost of implementing an RF system by having radio frequency transmitter and receiver share a common antenna.

Regarding claim 16, Franca-Neto further discloses the first transceiver is a receiver and the second transceiver is a transmitter (col. 2 line 40 through col. 3 line 16 Fig. 1).

Regarding claim 17, Franca-Neto further discloses both the first and the second transceivers are receivers (col. 2 line 40 through col. 3 line 16 Fig. 1).

Regarding claim 18, Franca-Neto further discloses the first transceiver is connected to the first port via a balun (col. 3 line 48 through col. 4 line 4 Fig. 3).

Regarding claim 19, Franca-Neto further discloses the second transceiver is connected to the second port via a balun (col. 3 line 48 through col. 4 line 4 Fig. 3).

7. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing") further in view of Bradley et al. (EP 1,058,383 hereinafter, "Bradley") as applied to claim 12 above and further in view of Ella (U.S PAT. 6,081,171).

Regarding claim 29, the applicant admitted prior art, Dailing, and Bradley in combination, fails to discloses at least one of the acoustic resonators is a bridge-type bulk acoustic wave device. However, Ella teaches at least one of the acoustic resonators is a bridge-type bulk acoustic wave device (col. 17 lines 16-23 Fig. 1A & 1B). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Ella into view of the applicant admitted prior art, Dailing, and Bradley in order to improve frequency response characteristics relative to the Multi-pole Bulk Acoustic Wave Resonator Stacked Crystal Filter filtering circuit or device and includes a reduced number of passive components relative to the number of such components included in at least some conventional multi-pole filters.

Regarding claim 30, Ella further discloses at least one of the acoustic resonators is a mirror-type bulk acoustic wave device.

***Conclusion***

8. Any response to this action should be mailed to:

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Hand-delivered responses should be brought to:

Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22313

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is (571)272-8329. The examiner can normally be reached on 8:00Am - 5:00Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (571)272-7499. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Tuan Nguyen  
Examiner

Art Unit 2643

  
CURTIS KUNTZ  
SUPervisor PATENT EXAMINER  
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